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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/816,385	04/01/2004	Feng-Wen Sun	PD-203051	9374

20991 7590 08/03/2010

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PATENT DOCKET ADMINISTRATION
CA / LA1 / A109
2230 E. IMPERIAL HIGHWAY
EL SEGUNDO, CA 90245

EXAMINER	
HAILU, KIBROM T	

ART UNIT	PAPER NUMBER
2461	

MAIL DATE	DELIVERY MODE
08/03/2010	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/816,385	SUN ET AL.	
	Examiner	Art Unit	
	KIBROM T. HAILU	2461	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 July 2010*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-21,50 and 51* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-21,50 and 51* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *4/1/2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on July 26, 2010 has been entered.

Response to Arguments

2. Applicants' arguments filed July 26, 2010 have been fully considered but they are not persuasive because the Examiner believes the cited references in the previous office action disclose the claimed invention.

The Applicants' arguments on page 9-11 of the REMARKS are not persuasive in view of the following disclosure, and therefore, the claims are not patentable.

First, the Applicants argue that Christodoulides discloses the unique word (UW) is added to the coded data Transmit Synchroniser 30, and then the coded data with the unique word is mapped to a signal constellation, thus teaches away from performing step 1 of the claim.

First of all, the Examiner respectfully submits that Applicants aren't relying on what is being claimed. The claim only says that the codeword is mapped according to a signal constellation. Therefore, it doesn't really matter when the mapping is occurred as long as the claim explicitly doesn't say it. In fact, up on reading paragraphs [0035]; [0048]; [0053] and [0084] of the current application, the Examiner understands that by

mapping the codeword to the transmitting frame, it will assist the receiver (a modem) to achieve carrier synchronization. Plus, the synchroniser 30 of Christodoulides simply provides four bits of the frame or the UW to the modulator because the modulator is 16 QAM modulator. If synchronization is achieved before the UW is mapped by the modulator, then there is no need for it (modulator). Actually, the Applicants' interpretation that Christodoulides maps the UW after frame synchronization is not right because it is the final frame structure, let alone the mapping of the UW, that will support the synchronization with the receiver. Therefore, the Applicants' argument that, in Christodoulides, frame synchronization is achieved before mapping the UW is not persuasive.

The Applicants also argue that Christodoulides is devoid of any description or suggestion that a physical layer signaling header for frame is generated based on data streams that have been multiplexed to form frame synchronization. Well, the Examiner respectfully disagrees with the above argument. As provided in the previous office action, Christodoulides clearly discloses that data is multiplexed with signaling information and the signaling information is outputted or transmitted with the frames (please read col. 1, lines 61-67; col. 4, lines 1-6; col. 5, lines 51-52; col. 5, line 66-col. 6, line 10).

As per the Applicants' argument that Mowbray's data streams are not the same as each other (duplicate), the Examiner doesn't provide Mowbray for that purpose but for the demultiplexing the data stream. On the hand Miyoshi teaches duplicating the divided or multiplexed data stream.

The Applicants' argument that Miyoshi duplicates the bit sequence and then mapping the duplicated bit sequences to separate signal constellations, therefore, Miyoshi

teaches away from the claimed steps (1) and (2). The Examiner doesn't see any difference between duplicating the data stream first or after mapping, as the output result is the same. Otherwise, the Applicants need to give a concrete technical and/or practical reason why.

The Applicants also argue that Raleigh does not teach or suggest that a modified first data stream, which was the same as the second data stream before modification, is multiplexed with the second data stream to form a frame synchronization structure in the multiplexed data streams. First of all, Raleigh clearly teaches that the source data is partitioned into two data streams (I data and Q data). Second, Raleigh doesn't say that the two are different. Third, Miyoshi already teaches duplicating the data stream. Therefore, what is needed is modifying one of the data streams of Miyoshi by multiplying a constant number, and the data stream doesn't have to be the same because this is already taught by Miyoshi. All of the claim limitations do not have to be taught by one reference.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.

4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. Claims 1-2, 4, 9-10, 11-13, 15, 20-21 and 50-51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Christodoulides et al. (US 6.665,361 B1) in view of Mowbray et al. (US 6,119,263), and further in view of Miyoshi et al. (US 7,372,908 B2) and Raleigh et al. (US 6,158,041).

Regarding claims 1-2, 4, 10, 13, and 21, Christodoulides discloses a method for supporting frame synchronization in a digital communication system (col. 4, lines 16-19), the method comprising the steps of: mapping a codeword specifying framing information of a frame according to a signal constellation to output a data stream (Fig. 5; col. 5, lines 43-48, 56-58); and outputting a physical layer signaling header corresponding to the frame based on the multiplexed data streams (col. 1, lines 61-67; col. 4, lines 1-6; col. 5, lines 51-52; col. 5, line 66-col. 6, line 10).

Christodoulides doesn't disclose duplicating and demultiplexing the data stream into a first data stream and a second data stream that are the same as each other, modifying the first data stream according to a predetermined operation; multiplexing the modified first data stream with the second data stream to form a frame synchronization structure in the multiplexed data streams; and the constellation is independent of a modulation scheme of the frame.

Mowbray teaches demultiplexing the data stream into a first data stream and a second data stream (Fig. 1; col. 3, lines 6-15). However, Mowbray doesn't teach the demultiplexed packets are duplicating packets; modifying the first data stream according

to a predetermined operation; multiplexing the modified first data stream with the second data stream.

Miyoshi teaches the demultiplexed packets are duplicating packets that are the same as each other, and the constellation (such as BPSK) is independent of a modulation scheme of the frame (Fig. 1, 19; abstract; col. 2, lines 43-67; col. 4, line 56-col. 5, line 6).

Miyoshi doesn't explicitly teach modifying the first data stream according to a predetermined operation; multiplexing the modified first data stream with the second data stream to form a frame synchronization structure in the multiplexed data streams.

Raleigh teaches modifying the first data stream according to a predetermined operation (Fig. 2; col. 4, lines 61-64, illustrates the first data stream is modified by multiplying the value i by the multiplier 222); multiplexing the modified first data stream with the second data stream to form a frame synchronization structure in the multiplexed data streams (Fig. 2; col. 4, line 65-col. 5, line 1; col. 8, lines 33-44; explains the first data stream modified by multiplier 222 and the second data stream are combined or multiplexed by the summer 224 and the combined output is interleaved by interleaver, and it is clear that transmitted symbol stream assists the receiver to synchronize with the tranmitter).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate duplicating and demultiplexing the data stream into a first data stream and a second data stream, and the constellation is independent of a modulation scheme of the frame, modifying the first data stream according to a predetermined operation; multiplexing the modified first data stream with the second data stream to form a frame synchronization structure in the multiplexed data

streams as taught by Mowbray, Miyoshi and Raleigh into the satellite communication of Christodoulides in order to improve the speed of higher-capacity networks that require higher-speed and to be able to reconfigure the amount of information which can be transmitted on the channel within the available transmission frames that maximizes message throughput on the channel, capable of improving reception quality without performing transmission and retransmission, and the decoder would not be overwhelmed with successive errors, thus optimize performance and avoid degrading the system.

Regarding claim 9 and 20, Chrisodoulides discloses scrambling the multiplexed data streams (col. 4, lines 3-6).

Regarding claims 11-12 and 15, the same rejections to claims 1 and 4 are applicable hereto. The claims are just mere reformulation of claim 1 and 4 in order to define the corresponding computer-readable medium and apparatus.

Regarding claims 50-51, Chrisodoulides discloses the data stream includes a unique word to assist with synchronization (col. 4, lines 16-19).

6. Claims 3 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Christodoulides in view of Mowbray, Miyoshi, and Raleigh, as applied to claims 1 and 12 above, further in view of Mpgre et al. (US 2004/0047433 A1).

Christodoulides discloses a frame format for satellite communication (abstract). Christodoulides doesn't disclose the frame is a Low Density Parity Check (LDPC) coded frame.

Mogre teaches the frame is a Low Density Parity Check (LDPC) coded frame (paragraph [0018]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use LDPC frame format of Mogre in the modified satellite communiation of Christodoulides to efficiently transmit broadband service content using the LDPC that may operate efficiently and effectively using preexisting bandwidth allocated, and avoid attenuation problems when broadcast at preexisting transmission power level.

7. Claims 5-6 and 16-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Christodoulides in view of Mowbray, Miyoshi and Raleigh, and further in view of Gardner (US 5,627,499).

The claims include features corresponding to subject matter mentioned above to the rejected claim 1 except a sign of the multiplier represents a portion of the framing information, bits of the first data stream are interleaved with respective additional bits, the additional bits being phase rotated relative to the bits of the first data stream during modulation.

However, Gardner teaches a sign of the multiplier represents a portion of the framing information, bits of the first data stream are interleaved with respective additional bits, the additional bits being phase rotated relative to the bits of the first data stream during modulation (Figs. 2 and 3; col. 4, lines 31-59, illustrates "...the effect of adding multiple 90 degrees to the 8-bit digital representation of the in-phase…bit in the shift register is a logical one, the counter increments the phase by 90 degrees. Alternatively, when the oldest bit in the shift register is a logical zero, the counter decrements the phase by 90 degrees, and rotating the bits by multiples of 90 degrees).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a sign of the multiplier represents a portion of the framing information, bits of the first data stream are interleaved with respective additional bits, the additional bits being phase rotated relative to the bits of the first data stream during modulation Gardner into the modified satellite communication of Christodoulides in order to be able to reconfigure the amount of information which can be transmitted on the channel within the available transmission frames that maximizes message throughput on the channel, to reduce size and cost of a circuit.

8. Claims 7 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Christodoulides in view of Mowbray, Miyoshi, and Raleigh, as applied to claims 1 and 12 above, further in view of Kim et al. (US 6,851,085 B2).

The modified to the satellite communication of Christodoulides discloses generating the codeword or unique word according to turbo or convolutional code. However, Christodoulides doesn't disclose generating the codeword according to a first order Reed-Muller code.

Kim teaches generating the codeword according to a first order Reed-Muller code (col. 2, lines 24-36).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the first order Reed-Muller code to generate codeword as taught by Kim in to the satellite communication of Christodoulides so that a smaller and simplified hardware would be used to generate the codeword at different coding rates, that is, for the input of different information bits reduces the number of

required encoders, simplifies the encoder and decoder structure, and as a consequence, decreases their size.

9. Claims 8 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Christodoulides in view of the satellite communication of Mowbray, Miyoshi, and Raleigh, as applied to claims 1 and 12 above, further in view of Love et al. (US 7,158,482 B2).

The modified satellite communication of Crhrisodoulides discloses the framing information. However, the modified satellite communication of Chrisodoulides doesn't explicitly the framing information specifies a modulation scheme, and a coding scheme.

Love teaches the framing information specifies a modulation scheme, and a coding scheme (Fig. 4; col. 5, lines 55-60).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate framing information or field indicating modulation and coding schemes as taught by Love into the modified satellite communication of Chrisodoulides in order to improve data throughput of the system, and properly demodulate and decode the data streams.

Conclusion

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to KIBROM T. HAILU whose telephone number is (571)270-1209. The examiner can normally be reached on Monday-Thursday 8:30AM-6:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Huy D. Vu can be reached on (571)272-3155. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Kibrom T Hailu/

Examiner, Art Unit 2461

/Huy D Vu/

Supervisory Patent Examiner, Art Unit 2461